


Knowledge Transfer Strategy for Social Entrepreneurship based on Local Agro-resources for Food and Health Industries

Professor Dato Dr Hj Ibrahim Che Omar

DEng, PSK, JMN, DPSK (Kelantan) FASc

Campus Director Universiti Malaysia Kelantan Jeli Campus, Malaysia

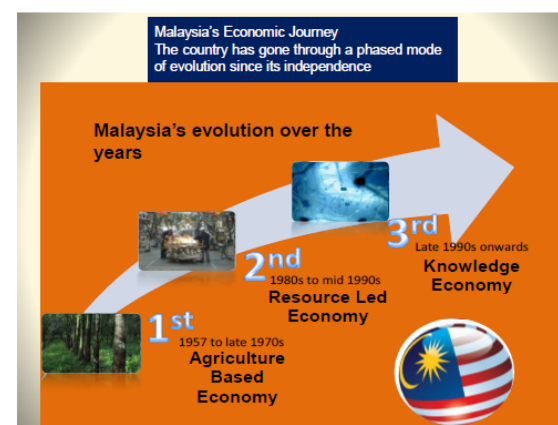
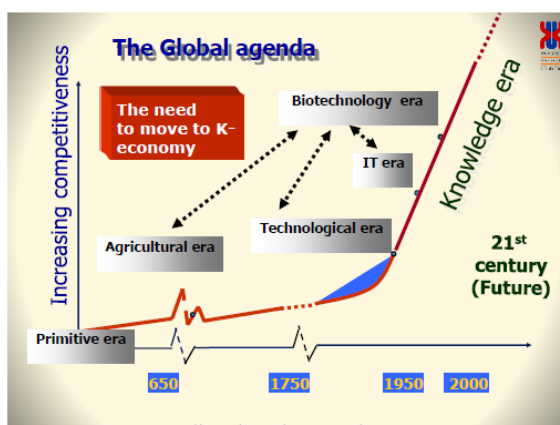
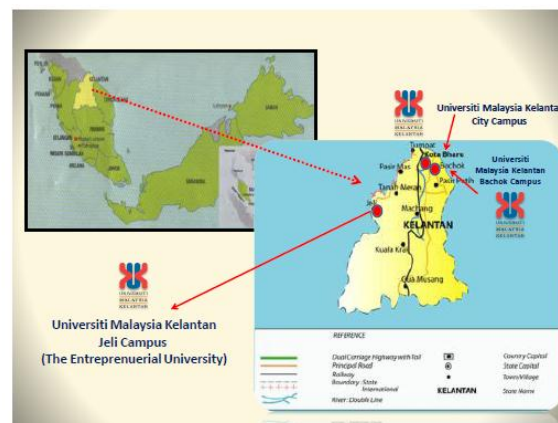
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(Key Note Paper)

Professor Dato Dr Hj Ibrahim Che Omar
DEng, PSK, JMN, DPSK (Kelantan) FASc
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Universiti Malaysia Kelantan Jeli Campus
Malaysia



10MP Strategic Thrusts... structural transformation

DEFINITION OF KNOWLEDGE TRANSFER PROGRAMME (KTP)

- KTP recognises a broad range of activities to support mutually beneficial collaborations between universities, industries and communities (government agencies/Non Government Organizations (NGOs)/public sector).
- It provides the platform for the exchange of tangible and intangible intellectual property, expertise, learning and skills between academia, industry and the community.
- The forms of interactions may include joint research, consultancy, education, training, graduate development, conferences, sharing of physical facilities and student placements.
- Public Higher Education Institutions should effectively engage with industry and community towards mutually beneficial initiatives through role played by:

OBJECTIVES OF KNOWLEDGE TRANSFER PROGRAMME (KTP)

Knowledge Transfer Programme (KTP)

It provides the platform for the exchange of tangible and intangible intellectual property, expertise, learning and skills between academia, industry and the community

- **Academia:** able to incorporate relevant and up to date knowledge from industry and the community into their teaching, learning and consultancy activities.
- **Industry:** can utilize the resources of IPTAs to enhance their business capability and economic activities
- **Community:** can benefit from the knowledge generated in IPTAs to improve quality of life within the community.
- **Graduate/Postgraduate Intern :** enhance their personal and professional development

Key Areas in knowledge Transfer

- Education - Raising the level of education in certain areas
 - Economy - Economic gain in identified sectors
 - Sustainability and Green Technology Initiatives
 - The Disadvantage Groups
- Developing Industry Relevant Curriculum (For High Impact sector)

ROLES OF KNOWLEDGE TRANSFER PROGRAMME

- **Enhance and Enrich Knowledge Transfer in public universities -**
 1. Total number of Knowledge Transfer and Academic projects in collaboration with Industry/Community
 2. Value of investment for enhancement and enrichment of Knowledge Transfer projects
- **KTP as Catalyst for Industry and/or Community Growth**
 1. Number of catalyst/flagship Knowledge Transfer and Academic projects implemented according to Industry and Community KRAs.
 2. Value of investment for catalyst/flagship projects (inclusive of contributions by Industry/Community).
- **Agent of Change for Sustainable Knowledge Transfer**
 1. Number of best practices in Knowledge Transfer adopted by Community and innovations accepted by Industry, respectively.

GOAL OF KNOWLEDGE TRANSFER PROGRAMME (KTP)

- To enable the development and improvement of the quality of products, services and policies to be shared for mutual benefits between the stakeholders i.e. academia, industry, community and the graduate/postgraduate intern.
- Aligning agriculture to improve household nutrition security
- Understand nutrition objectives which will be used in the integrated agriculture-health programmes.

KEY RESULT AREA (KRA) OF KNOWLEDGE TRANSFER PROGRAMME (KTP)

- Education - raising level of education in certain areas.
- **Economic gains for sector/s of industry in identified sector.**
- Sustainability and Green Technology Initiatives.
- The Disadvantage groups.
- Developing Industry Relevant curriculum (for High Impact sector).

Introduction to Local Resources for Food and Health

Consumer interest in local resources is growing. Need to identify resources for farmers and organizations and they are looking to get involved.

What are Local Resources for food and health?

There are many reasons why people purchase local food. Does one of the following statements sound like you?

- I want the freshest and best tasting food possible.
- I am concerned about the distance that food typically travels before reaching my plate.
- In purchasing food from local farmers I know and trust, I hope to better ensure that sustainable growing practices will be utilized.
- I want to support the businesses of my local farmers and support local economies and diversified local agriculture.



Food Environment

- The physical presence of food that affects a person's diet,
- A person's proximity to food store locations,
- The distribution of food stores, food service, and any physical entity by which food may be obtained, or
- A connected system that allows access to food.
- The food environment is also known as the community food environment, nutritional food environment, or local food environment. The retail food environment includes the community level (e.g., presence and locations of food stores, markets, or both) and the consumer level (e.g., healthful, affordable foods in stores, in markets, or in both).
- Good nutrition is vital to good health, disease prevention, and essential for healthy growth and development of children and adolescents. Evidence suggests that a diet of nutritious foods and a routine of increased physical activity could help reduce the incidence of heart disease, cancer, and diabetes



Agriculture



Crop-Based Clusters

- Fruit & Vegetable
- Highland Agriculture/Floriculture
- Herbs/traditional plants
- Tobacco
- Palm oil
- Kenaf
- Rice
- Cocoa

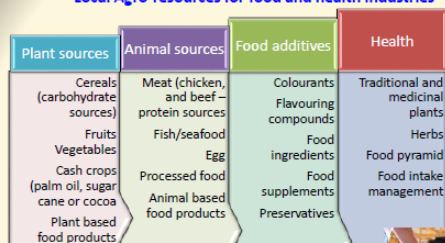
Fish-Based Clusters

- Marine Capture Fisheries
- Brackishwater Aquaculture
- Freshwater Aquaculture
- Recreational Fisheries

Livestock-Based Clusters

- Beef
- Mutton
- Poultry
- Breeder animals
- Animal feed Production

Local Agro-resources for food and health industries



Improving nutrition through agricultural practices – efficient and effective production, highly nutritious, biofortified food, food safety and better policies



Agriculture in Malaysia : Selected crop production ('000 tonnes)

Commodities	1998	2000	2004	2005	2006	2007
Coconut oil	40	28	42	31	28	13
Tea	23	-	3	4	4	8
Crude palm oil	8,320	10,842	13,976	15,023	15,500	16,000
Rubber	886	928	1,160	1,126	1,163	1,200
Cocoa beans	90	70	33	33.3	30	30
Pepper	19	24	20	19	21	21
Rice	1,267	1,382	1,348	1,388	1,420	1,486
Fruits	Na	1,209	1,532	1,608	1,762	1,949
Vegetables	Na	405	587	581	599	623
Cash crops	Na	86	118	109	129	155
Flowers	72	120	178	135	146	161
Spices	Na	21	20	36	43	52
Pineapple	Na	266	197	365	380	428
Herbs	Na	Na	0.51	0.52	1.40	1.8

External Trade for Agricultural sector (RM millions)

Item	1998	2000	2004	2005	2006	2007
Total exports	206,563	373,270	481,253	535,785	588,965	263,130
Total imports	228,124	311,459	399,532	434,010	480,773	239,448
Balance of trade	58,439	61,811	81,621	99,778	108,193	43,681
Total agricultural sector exports	45,480	39,837	61,797	62,872	71,197	37,318
% Agricultural exports	15.9	10.7	12.8	11.8	12.1	13.2
Total agricultural sector imports	21,225	24,266	35,412	36,313	40,311	21,663
% Agricultural imports	9.3	7.6	8.9	8.4	8.4	9.0
Balance of trade	24,255	15,571	26,385	26,559	30,886	15,685

Local Food systems

- "Local food system" refers to the interrelated pieces of food production and processing, distribution and direct marketing, and consumption that strengthen the economic, environmental, social and nutritional health of a geographic region.
- General information on local food systems before delving into more specific sub-topics, including food policy and law, community food security and access, farm-to-school programs, urban agriculture and community gardening, and farmland conservation.
- Also included is information on sustainable and organic agriculture; while these concepts are not mutually exclusive, there is natural overlap.
- The interdisciplinary nature of food systems research -- as well as the growing popularity of "local foods" in our culture



Malaysian Food Sources

Examining the top sources of dietary constituents that should be reduced is especially helpful for identifying targets for changes in the marketplace and food environment.

- Level 1 : Rice, noodles, bread, cereal, cereal products and tubers (Main source of carbohydrate which provides energy (50 - 55% of total daily energy). A great source of vitamins and mineral and dietary fiber. Dietary fibres provide many beneficial effects such as regular bowel movement, good gut health, lowering cholesterol and blood glucose. Choose grain products from whole grain such as wholemeal bread, brown rice, oats and barley. Whole grain contains more fibres.
- Level 2 : Fruits and vegetables (Good sources of fibre, vitamins and minerals and phytochemical, which help strengthen the immunity. Eat plenty of fruits and vegetables everyday. Beneficial in health especially in preventing several chronic diseases such as diabetes mellitus type 2, cardiovascular diseases and certain cancers.
- Eat a variety of vegetables and fruits every day. Vegetables can be fresh green leafy vegetables, other fresh vegetables including various coloured vegetables including fruit vegetables, bean vegetables, ulum, canned and frozen vegetables. Choose fresh fruits. Fruit juices may replace not more than one serving of fruit.



- Level 3 : Fish, poultry, meat and legumes (Good sources of protein, the body's building block. Rich in vitamin B, iron, folate and zinc. Legumes are generally good sources of protein and also count as starchy food that can serve as excellent sources of dietary fibre. Legumes also low in fat and contain no cholesterol as compared to meat and poultry.

Legumes are encouraged to be consumed daily. Choose fish more frequently -- if possible daily. Choose meat and poultry that are low in fat and cholesterol, for example remove the chicken skin before cooking or choose lean meat.

- Level 4 : Milk and dairy products (High in protein, rich in calcium and wide range of minerals and vitamin such as vitamin A, riboflavin, vitamin B12 and zinc. Milk builds strong bones and teeth and maximises bone gain from an early age. This can help prevent osteoporosis later in life. Milk and dairy products should be consumed everyday and whatever age.

- Level 5 : oils, sugar and salt, Fats, oils, sugar and salt (Located on the crest or top of the pyramid shows these foods should be taken in small amounts only. Excessive intake of fats, oil, sugar and salt can contribute to higher risk of chronic diseases such as obesity, diabetes mellitus, cardiovascular diseases, hypertension and cancers. Limit intake of foods high in fats, oil, sugar and salt.



Fostering a system that nurtures sustainability

- By doing our best to diversify what we eat, we not only better serve our bodies, but also the environment and oceans.
- Today, supermarkets carry what consumers request and, by extension, food producers supply that food. But when, for example, consumers demand a wide selection of produce year-round—even when local growing seasons do not support its availability—food must be imported from far away places, which increases the carbon footprint of our meals.
- In Malaysia, there are hundreds of available commercial agro products, yet we normally eat only some of these products. If consumers requested for new products, we would be participating in a more sustainable relationship with the our ecosystem.
- This will encourage agro industries, food distributors, and supermarkets alike to use all the possible resources available in our food system and the environment.



Food and Food Security

The food we eat determines how healthy we are; yet the food available to us may do more harm than good—both to our health, and to the health of the land and oceans that provide it. At the same time, climate change contributed to extreme weather events that threaten a secure food supply. As individual consumers, and as employees in corporations, we make decisions every day about the food we buy, which gives us great power to reshape the way we produce, process, transport, and use food.

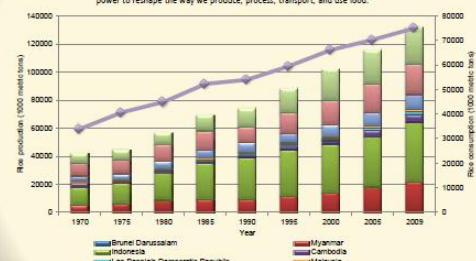


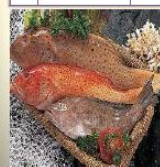
Figure 3: Rice production and consumption in South East Asia countries between 1970 and 2009 (Data from FAOSTAT 2013).

National Key Economic Areas (NKEA) - 4 areas in Agriculture



1 Integrated Aquaculture Farming

- Availability of Tasik Kenyir in Terengganu and Tasik Pergau in Kelantan for large scale aquaculture (3,000 ha available area for cage farming)
- Availability of large area and suitable site along the coastal of East Coast for fish and shrimp farming with a good sea water intake.
- Availability of suitable land and good quality of fresh water for large scale breeding and commercial freshwater fish farming.
- Availability of existing aquaculture activities including grow out and processing.



2 Integrated Aquaculture Farming

- Potential for export driven and high demand live fish with a focus to Hong Kong and China market (Including fish seed and marketable size table fish)
- Leveraging on marine fish capture from deep sea fishing in South China Sea for processing.
- Cheaper labour cost and availability of human resources in East Coast especially in the agriculture and aquaculture sector.
- Domestically improved quality fish broodstock (Genetically, diseases free & resistant, high growth rate)
- Reduced fish fry / fingerling import (particularly marine fish fry)



3 Development of Dairy Clusters

- Low self sufficiency level (2% SSL) i.e fresh milk consumptions. High dependency on import create an opportunity for business entry.
- Availability of large area for Dairy Clusters inclusive of area for pastures and fadders.
- Availability of green feed from the existing agriculture activities in East Coast Economic Region (ECER) as a fodder to the dairy cattle (e.g. pineapple, cassava, paddy, oil palm)
- Present development of "Zon Industri Tenuku" in ECER particularly in Muadzam Shah, Kuala Berang, Tanah Merah & Jemaluang).
- Dairy business could generate double benefit i.e. milk and meat production (plus by product such as organic fertiliser which have a huge demand in East Coast)



4 Development of Dairy Clusters


- Existing facilities in Muadzam Shah Cattle Research & Innovation Centre could contribute to the availability of local breed stock, technology and training for human capital.
- Existing higher educational involvement such as Universiti Malaysia Kelantan (UMK) as a Centre of Excellence (COE) for ECER projects and availability of experts for veterinary advisory.
- Inline with the state Livestock Industry Development Policy which is actively promoted for investors.
- High demand from halal market and linked to the development of Gambang and Pasir Mas Halal Park.
- Passionate to livestock amongst the East Coast citizen.

5 Integrated Cassava Cluster Development for High-end Products

- High demand of starch imports growing at 20% per annum over the last ten years for food processing & biotech companies amounting to 207,000 tons valued at RM207 million in 2009
- Diversified high-end products e.g. Amino acid (L Methionine for feed supplement), biopolymer, caramel, Maltodextrin, ethanol and MSG
- Production of amino acid as protein supplement will reduce the feed cost in Malaysia (poultry & aquaculture)
- Project linked and support private investment in Kerteh Polymer Park as source of feedstock (investment worth of RM3.5 billion)
- Project will generate green energy such as bio-gas production from waste produced in primary processing (starch).


6 Integrated Cassava Cluster Development for High-end Products

- Project will benefit large number of smallholders as satellite farmers and out-growers.
- Availability of large area for Cassava Plantations in East Coast for commercial planting.
- Potential involvement with existing plantation player in East Coast such as FELDA, Felcra, Risdia and State owned Plantation Companies to maximize their landuse to plant Cassava.
- Byproduct from Cassava processing such as fiber for feed could benefit livestock industry in East Coast such as Dairy Cluster in Muadzam, Kuala Berang and Tanah Merah as well as Goat & Sheep Cluster in Pekan, Kuala Berang and Besut Setiu.
- Opportunities to increase utilization on idle land in East Coast.



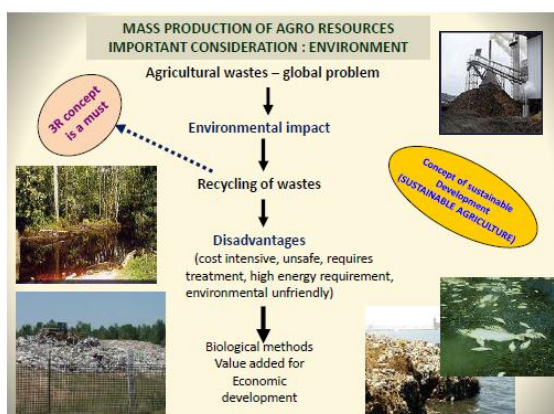
7 Development of Goat & Sheep Clusters

- Low self sufficiency level (9% SSL) i.e mutton/chevon consumptions. High dependency on import create an opportunity for business entry.
- Availability of large area for Goat & Sheep Clusters inclusive of area for pastures and fadders.
- Passionate to livestock amongst the East Coast citizen.
- Availability of green feed from the existing agriculture activities in ECER as a fodder to the dairy cattle (e.g. pineapple, cassava, paddy, oil palm)
- Present development of Grazing Reserve managed by DVS in ECER particularly in Kuala Berang & Tanah Merah.



7 Development of Goat & Sheep Clusters

- Goat & Sheep business could generate multiple benefit i.e. meat, hide and organic fertiliser, genetic material which have a huge demand in East Coast.
- Existing facilities in Kuala Berang Goat Breeding & Innovation Centre could contribute to the availability of local breed stock, technology and training for human capital.
- Existing higher educational involvement such as Universiti Malaysia Kelantan (UMK) as a Centre of Excellence (COE) for ECER projects and availability of experts for veterinary advisory.
- Inline with the state Livestock Industry Development Policy which is actively promoted for investors.
- High demand from halal market and linked to the development of Gambang and Pasir Mas Halal Park.

Social Entrepreneurship

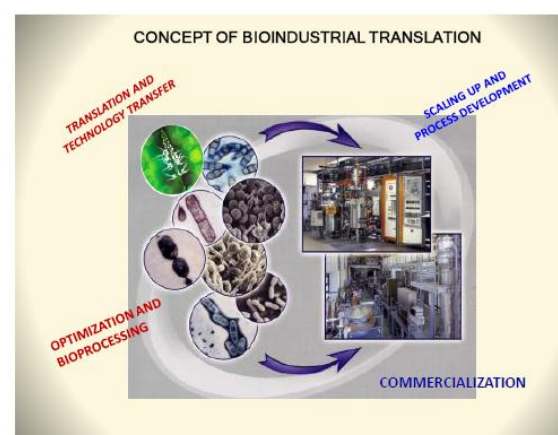
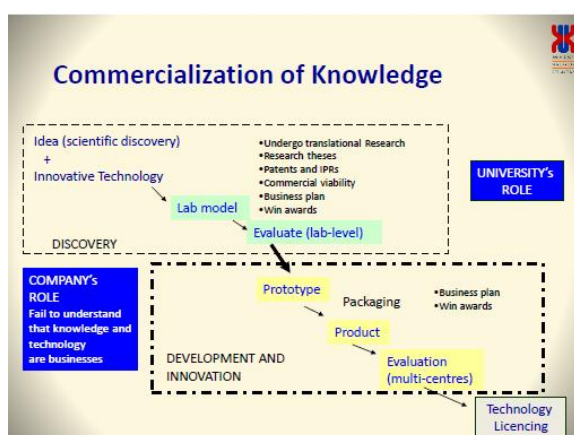
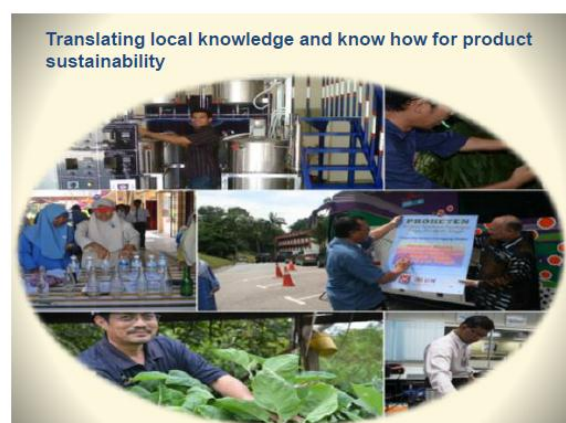
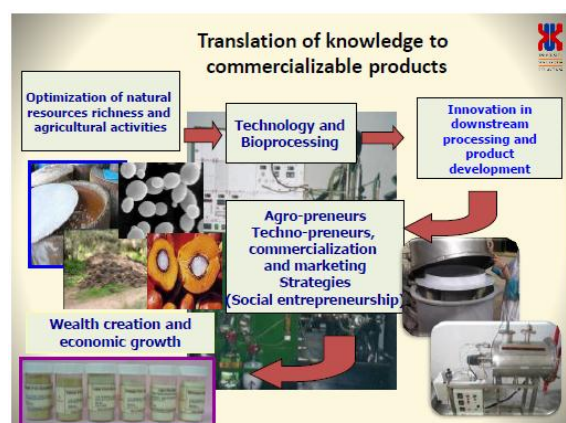
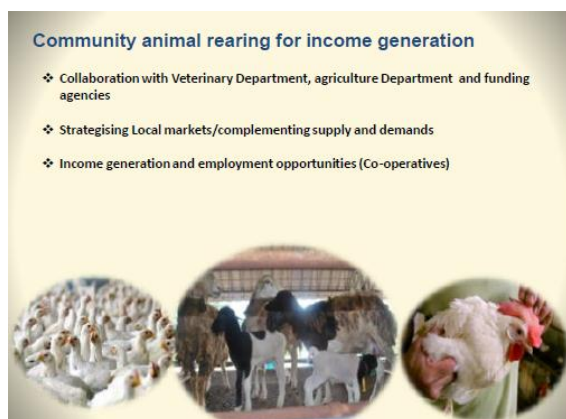
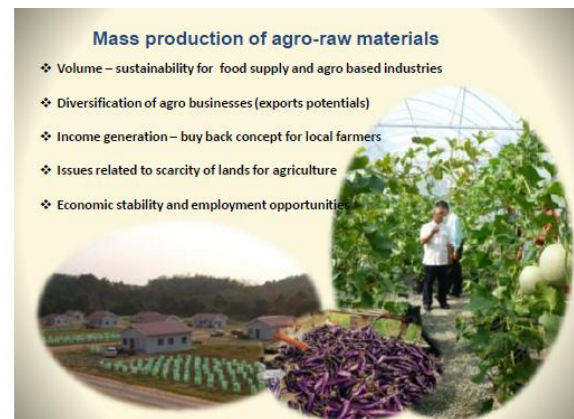
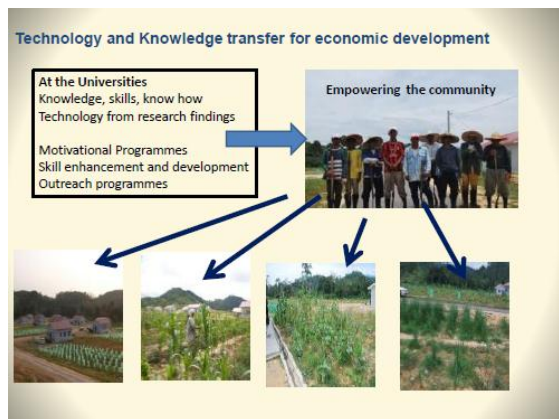
- Although, social entrepreneurship was initially defined as a process of pursuing innovative solutions to social problems (Thompson, 2002), however the process provides a wide business opportunities.
- Basically, a social entrepreneur will identify the social problems and will try to solve the problem which will create benefits to the society. In solving the problem, social entrepreneurs will harness the entrepreneurship skills.
- Research activities at Universities – source of knowledge and know how for the society to manage their local agroresources for the food industries.
- The society (specifically the agrarian communities) will be the source of local resources as raw materials for the existing food industries and the development of new products

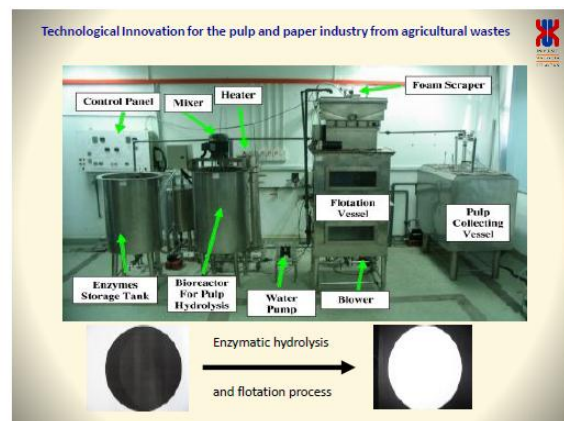
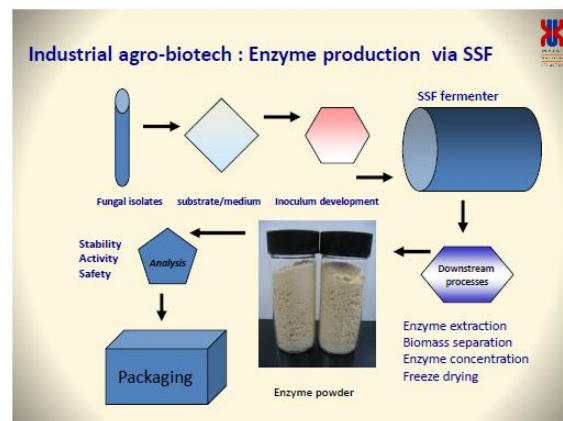
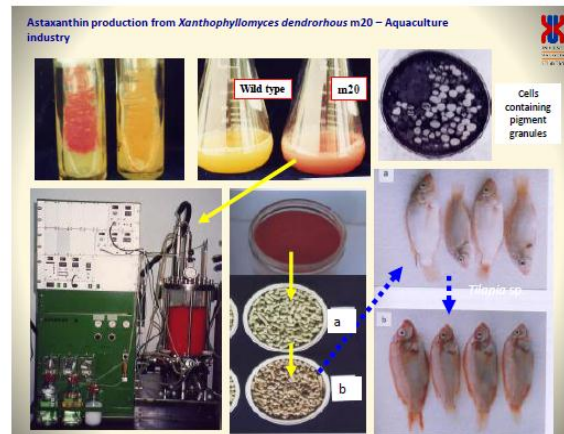
Community and Local Food Resources

Capacity development and extension, sustaining improved nutrition outcomes, gender, local empowerment, opportunities and cost effective approaches

- Working together for community change
- Demand for local food in rural communities is growing. sustainable local food systems need to have strong community support to build and maintain the infrastructure needed to bring food from farm to fork.
- Resources to support rural communities just beginning to build their community food systems as well as those whose local food systems are already strong. Resources are intended for farmers and producers, community organizations, and extension educators but may interest anyone in community and local foods.







Enzymatic Improvement of PKC as animal feeds

PKC

Aspergillus niger *Aspergillus terreus* *Trichoderma sp*

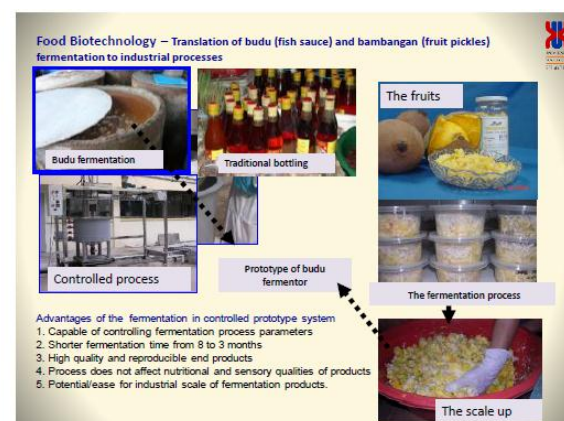
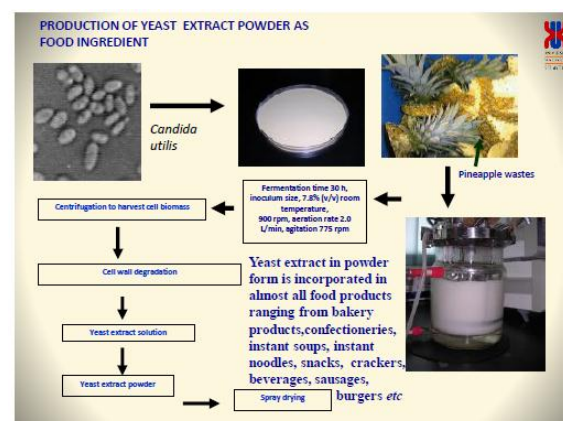
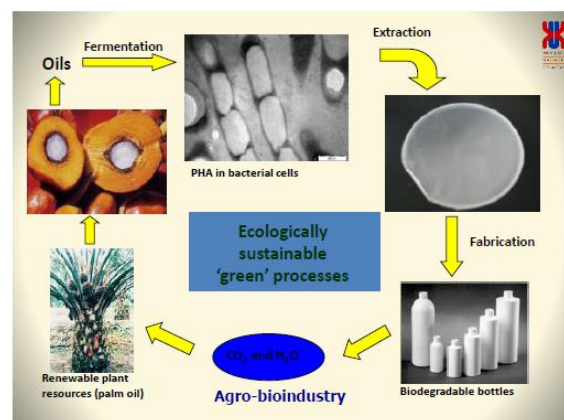
Tray system

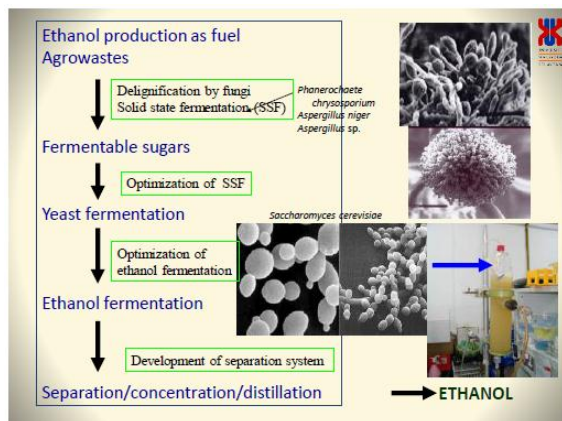
Treatment	Crude Protein (%)	Crude fibre (%)	Crude lipid (%)	Ash (%)	Gross energy (mg/g DM)
No treatment (- medium)	28.12	16.12	1.33	7.32	1,679
No treatment (+ medium)	34.47	17.88	1.57	9.79	2,128
Heating 80°C 1 hr	27.19	15.97	1.13	6.92	1,895
HCl 0.75 M, 80°C, 3 hr	25.15	15.67	1.65	7.27	0,913
NaOH 0.5 M, 30°C, 24 hr	32.43	17.64	1.46	9.27	2,103
VegPro (0.1% w/w), 30°C, 3 hr	31.89	17.88	1.96	6.78	2,015
Ronozyme (0.1% w/w), 30°C, 3 hr	25.19	15.33	2.02	7.66	1,962

Protease/phytase/xylanase/lipase/mannanase cellulase

Parameter	Control (M)	FPKC + 20% M	FPKC + 20% M + 20% M
Mean initial body weight (g)	98.77	98.87	98.81
Mean final body weight (g)	616.60	673.06	606.80
Mean total feed intake (g)	988.04	1138.04	962.92
Specific growth rate	7.14	6.22	7.08
Feed conversion rate	2.80	3.42	3.07

FPKC treated with Enzyme Veg Pro (0.1%) as chicken feeds





Pharmaceutical industry – Traditional medicine, medicinal plants, herbal products

- WHO estimates in many countries > 80% of rural population relied on traditional medicines (health care)
- **Herbal industry** in Malaysia is estimated to be RM8 billion and growing at the rate of 10% per annum
- **New products discovery** : Nutraceuticals (slimming products, dietary supplement, anti-neoplasia, aphrodisiac)
- **Herbal medicines** : metabolic disorder (hypertension, anti-diabetic, infectious diseases (anti-microbial, anti-malaria), anti-fertility, anti-obesity, anti-thrombotic, anti-inflammatory)
- **Sustainable herbal sources** : planting, in vitro micropropagation, bioreactor technology and molecular approaches
- **Scientific research** as evidences for claims
- **Quality control**
- **Safety and efficacy**
- **Standardized practices** : Good Agriculture Practice (GAP), Good Storage Practice (GSP), Good Laboratory Practice (GLP) and Good Clinical Practices (GCP)

TISSUE CULTURE TECHNOLOGY AND CELL SUSPENSION CULTIVATION

Mushroom cultivation

Cultures: *Pleurotus ostreatus*, *Agaricus bisporus*, *Lentinus edodes*, *Volvariella volvacea*

Rice husks/rice straws
Physical treatment (cook)

Substrate formulation
Determination of cultivation conditions (moisture, pH, temp)
Nutrient supplementation (C:N ratio): (18:1-13:1)
Preparation of grain spawn (inoculum)
Incubation/bag and cabinet system
Inoculation/seeding

Fermentation processes
Modification of fermentation system
• Heat generation/transfer
• Changes in temp, CO₂ and O₂
• Air flow rate

Harvesting → Mass production → MUSHROOM

PRODUCTS

AGROBIOTECHNOLOGY
AGROBUSINESS
AGRO-PRENEURS

Plant breeding : new varieties with high productivity and disease resistance via molecular biology, cash crops vs food crops, fruit plants,

Animal breeding and technologies : new breed with high meat and milk production, reproduction technologies, disease control, aquaculture, poultry, feed industry

Tissue culture technology : mass plant production system, artificial seeds, micropropagation, metabolites

Agro-Technologies : methods of cultivation/growing, biofertilizer formulations/compost, harvesting methods, pest control, chemicals in agriculture

New agriculture associated activities : mushroom cultivation, herbal formulation, ornamental plants/fish, vermiculture, honey production, exotic animals/pets

Product development : diversifying products, packaging technology, enhance stability, activity and product marketability

Malaysian golden crop

Dried palm kernel cake

Empty fruit bunches

Oil palm shells

Oil palm fresh fruit fibers

Sugarcane bagasse

Paddy straws

Some of the lignocellulosic materials from Malaysian agrowastes : 60 MILLION TONS IN 2005

Commercializable high value products from microbial sources using agrowastes

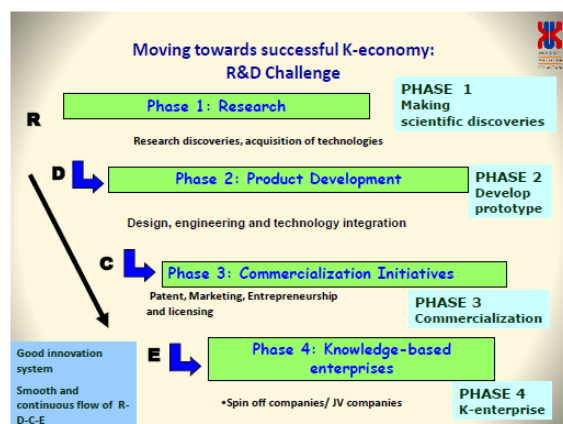
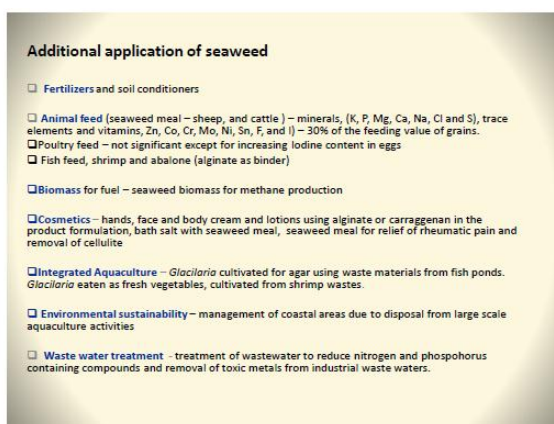
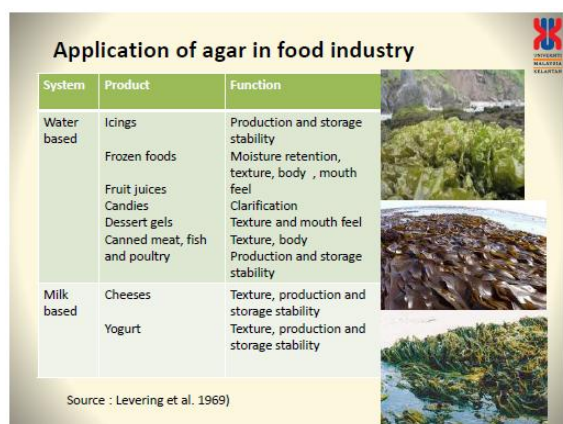
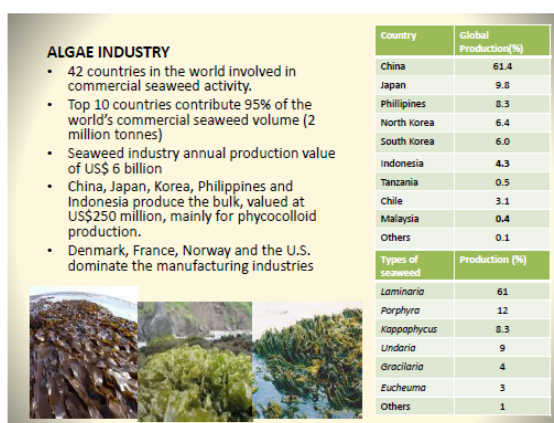
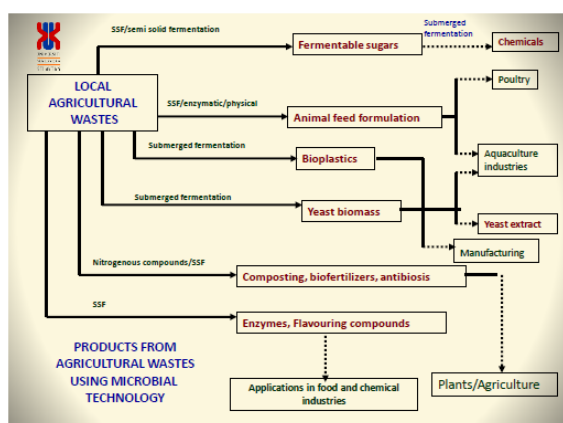
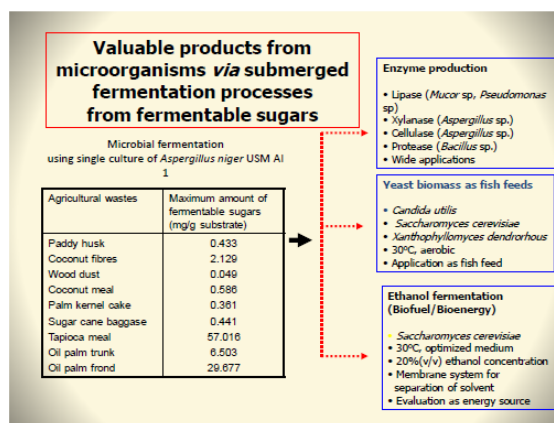
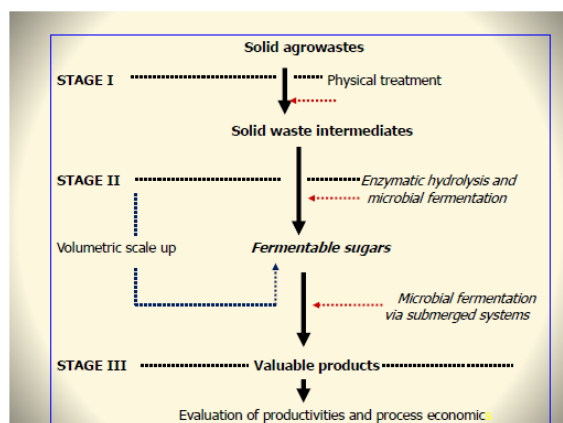
Why Solid State Fermentation (SSF):

- Simple
- Cost effective
- Environmental friendly
- High product concentration
- Ease in product purification
- Less contamination risk
- Applicable for production of various microbial products

The utilization of agrowastes as substrates for SSF

Medium formulation and fermentation conditions → BIOPRODUCTS via SSF

Compost, Flavouring cpd, Biofertilizer, Feeds, Enzymes



Basic components of biotech/agribusiness

- People**
 - Motivated people, with commitment, skill and knowledge
 - Driving entrepreneur is often a founding scientist with a good idea
 - Successful scientific entrepreneurs
- Attitudes and culture**
 - Academic sciences focus on subject, commercial science on object
 - Commercial science (developing science and state of the art equipment)
 - Real opportunity for career development and financial gain from inventiveness
- Strategy (strategic questions)**
 - Company's specific aim
 - First product based on new science driven product
 - Development program : skills and fund
 - Company competitive advantage

Do not confuse "strategy" and "mission statement"



Product vs service vs technology

A key aspect of your strategy is how your company is going to make money

Goals:

- Product company (invent, develop, sell or licence products)
- Tools company (develop tools or technologies for others to develop products (toolsets – technology platforms, Eg. Genomics or combinatorial chemistry)
- Solution providers – Integration of tools and merger an acquisition of companies

Success

Define criteria for success, commercial goals, shape strategy

Criteria :

- Achievement of milestones
- First product in Phase II clinical trials
- Signing a major collaboration with a renown pharmaceutical company
- Give initial investor a Internal Rate of Return (IRR) of >10% (measure of financial success)
- Profitable based on sales of products



Competitive advantage

You do something better than your competitors – Excellence

- You own the intellectual property of products – powerful argument patent an idea, process or invention
- Equip with necessary tools – Eg. Cell lines, gene clones or even production equipment (a good tool one that inherently cannot be duplicated)
- Skills – powerful competitive weapon (intellectual capital)
- Resources or financial capability of the company
- First to do it – opportunity and set a company to exploit it
- Competitive intelligence – future perspective



The business plan

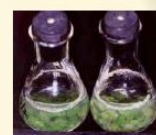
Tactical planning carried out by a team to bring scientific, product development, business and financial skills

: Identify science that can go to business

Considerations:

- What, who and where - science can do, manage
- Who will own the intellectual property?
- Who will manage the development programme?
- What are the key milestones?
- Identify company competitive advantage
- Financial status and funding
- Market potential
- What happen if it doesn't work?

Investment proposal



Investment in Agro-biotechnology business

- Put agribusiness ideas to be realised – Investment (investors)
- Different types of investors depending on the stage of the company
- Investors (not only as a source of money) but help with issues such as employment contracts, location, funding for expensive equipment, securing intellectual property and discussion with related parties.

Seed funding

- Develop idea to company
- To acquire key patents, create corporate entity, plan business plan, hiring expertise/professional

Private Funding

- Product development



Nature of successful agribusiness : Important requisites

- Clear objectives:** objectives serforth should be realistic and clearly defined; objectives are destination points for an agribusiness
- Planning :** pre-determined line of action. Planning is a proposal based on past experience and present trends for future actions (analysis of problems and finding solutions)
- Sound organization :** harmonies combination of manpower, machine material, money mangement etc. (organization – systematic combination of various related parts for achieving defined objectives in effective manner.
- Research :** "produce what the consumer wants" – market research (methods for production, improving quality of products and product development)
- Finance :** agribusiness should estimate financial requirement and management for the enterprise.
- Proper plant location, layout and size :** availability of infrastructure facilities, availability of inputs, skill labour and market distant.



CONCLUSION

- Malaysia/Kelantan primarily agriculture-based economy (conventional agriculture) → agro-biotechnology: knowledge based economy
- Revolutionise agriculture : commercial and export oriented agribusiness
- High productivity for local and global markets
- Private sectors involvement – joint venture to give impacts to socio-economy of the population
- Employment opportunities, building economy base for better standard of living
- Impacts on food processing, horticulture, seed business etc.
- Constraints : land use for agriculture, poor cold storage, downstream facilities, transport
- Enhanced farmer-industry cooperation and contract farming system
- Establishment of agro-industrial complexes and facilities, cold storage and infrastructure amenities, information technology and agro-clinics and agribusiness centres.



Thank you
ibrahim@umk.edu.my